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fectly unknowable by a mind which has no direct contact with reality; and it will always be impossible to decide with certainty whether they correspond to external objects or are convenient fictions for the practical, but not the theoretical, concerns of life.

A candid examination by the critical realists of the divergences in the views expressed in the coöperative volume might well correct the inadequacies of the theory. Those who are nearest to Locke are the most consistent in the development of their premises; and those who are most determined to be realists have the greatest trouble with the Lockian axiom of having only mental contents as immediate objects of the mind. In other words, if the group of writers here under review remain "critical" in their sense of the word as denying the direct contact of the mind with extra-mental objects, they have no logical basis for their realism; and if they wish to be realists with assurance, they have to cease to be consistently "critical." As it is, their realism should be called hypothetical or preferential or transcendental. But if they discard the assumption that the mind does not come into direct contact with external objects, realism would not have to be proved, and criticism might become more relevant to human concerns.

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"RELATIVITY, OLD AND NEW"

I SHOULD like to comment briefly on Professor Wadman's article so far as it is concerned with "objections" to my own remarks.¹ It seems to me that he has failed to appreciate my aim, and his criticisms are therefore almost wholly irrelevant. Had I been dealing with *the* aspects of relativity, they might be justified. But I confined myself to *some* aspects, while Professor Wadman treats of points which I deliberately omitted. My purpose was to insist that the theory has no direct bearing on the relativity of knowledge, or the subjectivity of time and space (p. 210). Everyone is familiar with the extreme views which have been advanced on these subjects; and from that standpoint it still remains true that "the philosophic problems of objective reality"—as such and in general—remain unaffected by recent developments; so far as they are concerned, the theory is a "benevolent neutral." That "objective reality is profoundly changed by the theory" (W., p. 206) is obviously true; and so far as our conceptual handling of

¹ This JOURNAL, Vol. XVIII, No. 8; XIX, No. 8. To avoid confusion in reference, I distinguish Professor Wadman's pages by W.

the external world is concerned, and subject (further) to certain qualifications which I still consider necessary in the interests of realism, Professor Wadman's presentation contains little more than what I have myself said (pp. 214, 215). But prior to all this there is the still more fundamental problem of the character of objective reality *in general*—not simply of its temporo-spatial basis or aspect; and it was with these preliminaries of the whole situation that I endeavored to deal, while Professor Wadman makes but the barest reference to them.

But when we pass beyond this general problem to others more specific, we must consider where the distinction is to be drawn between the philosophic enquiry and the scientific. It is, of course, impossible to be dogmatic here; but if we admit, for argument's sake, that the subjects discussed by Professor Wadman on pp. 206, 207, are truly philosophical, is this true also of the nature of the ether or the atomic nucleus, of Weyl's extension of the theory or Painlevé's and Wiechert's criticisms of it, or of the quantum theory or the physical mechanism of heredity? At some stage all these questions fall within pure science. Exactly where must remain always a matter of opinion; but a great part of Professor Wadman's article deals with what I should myself regard as scientific material; and we must here recall Einstein's own assertion that "there was nothing specially, certainly nothing intentionally, philosophical about" his investigation.² We may compare with this—"It would be wrong to associate any metaphysical speculations with the introduction of the four-dimensional point of view"; "the theory is physical and not metaphysical; upon what particular basis bare matter depends is a question not for the philosopher but the physicist to decide."³ We must recognize, then, that what is interesting to philosophers is not always of philosophic interest.

The rôle of "light and vision in normal experience" appears to me fundamentally important. The theoretical results (W., p. 207) are unquestionable, though to speak of a "fundamental velocity that is invariant," but which is still not the velocity of some actual entity, seems meaningless abstraction. But the question still remains—How are these results arrived at in the first instance? Upon what is "the discovery that there is a fundamental invariant velocity" based? They must be based upon observed coincidences as the content of *perceptual experience*; abolish these, and nothing remains whereon to found a theory of any kind. "We observe a

² *Nature*, 16 June, 1921, p. 504. Cf. his account of the growth of his theory in *Nature*, 17 Feb., 1921, p. 782. I may refer to the fuller discussion of these points in the current Volume of *Mind*.

³ Schlick, *Space and Time*, p. 51. Alexander, *Spinoza and Time*, pp. 39, 45.

coincidence, an event. In each several map of the universe the event is uniquely recorded as a single coincidence. The only precise observations are those of coincidences."⁴ But why, again, should "*c*" remain paradoxically invariant for all observers?⁵ Once more because the perceived light phenomena furnish the sole available means for their own investigation, while light travels with finite velocity. The physicist is here left with nothing to hoist himself by except his own waist belt; the inevitable result is invariance, and the paradox in both cases is merely apparent. So far as the *indispensable initial observations* are concerned, therefore, it is the non-existence of any phenomenon which can be *perceived* and compared with light signals that is fundamental. "We have not taken account," asserts Einstein in recounting the development of his theory, "of the inaccuracy involved by the finiteness of the velocity of light";⁶ "if some new kind of ray with a higher speed were discovered, it would perhaps tend to displace light signals and light velocity."⁷ Finally, if we assume gravitational impulses arising which had an *infinite* velocity, and also that we could directly perceive their effects,⁸ relativity phenomena might be excluded from consideration altogether.

In conclusion, what Professor Wadman calls my "exposition of the transformation in terms of sound" (p. 206) was offered as nothing more than a somewhat crude illustration based on "familiar occurrences." When the article was written many readers found an insuperable difficulty in discovering analogies to the new theory in ordinary experience. It still remains true, I think, that to them Professor Wadman's concise outline would have been incomprehensible. I certainly did not regard it as a wholly satisfactory substitute, and the "Prince of Denmark" note merely emphasized the insufficiency of the analogy; it is unfortunate that no precise parallel can be offered; but the actual phenomena are, of course, unique; "*c* plays a unique part in Nature."⁹ Professor Wadman suggests that my imaginary observers should be "lacking in other respects than eyesight" (W., p. 206); but as they already derived

⁴ Cunningham, *Relativity and the Electron Theory*, pp. 93, 126. Cf. Brose, *The Theory of Relativity*, p. 14; Eddington, *Space, Time and Gravitation*, p. 87. Both "coincidence" and "observation" are fundamental.

⁵ I omit gravitation for brevity.

⁶ *The Theory of Relativity*, p. 10. Cf. Campbell, *Physics, The Elements*, p. 552.

⁷ Eddington, *Space, Time and Gravitation*, p. 60.

⁸ An assumption on all fours with Professor Wadman's hyperesthesia, p. 206. The infinity of gravitational transmission is, I think, still an open question.

⁹ Schlick, *op. cit.*, p. 15.

"all their knowledge *solely from hearing*" (p. 212) it seems to me that any further loss would reduce them to helpless dependence on their "unconscious"; or, at the most, transform them into behaviorists.

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BOOK REVIEWS

Psychologie der Kunst. Bd. I. RICH. MÜLLER-FREIENFELS. Leipzig: B. G. Teubner. 1922. Pp. viii + 248.

The first edition of this book appeared in two volumes in 1912. The present revision has been so thorough and the changes in both form and content are so numerous that it seems almost like a new book. The arrangement of the topics is somewhat different, much new material has been added, some of the latest theories and tendencies such as the Freudian have been considered, more examples have been used and a few illustrations of paintings, designs and music are now included. Above all the esthetic principle of unity is more closely followed in the composition so that the text holds together, a factor which considerably increases the pleasure of the reader.

It would be tedious and unprofitable to give a detailed enumeration of the changes that have been made. I will, therefore, describe briefly the more important ideas even though some of them have already appeared in the first edition.

The author takes exception to a theoretical, philosophical discussion of esthetics in the belief that the only method to be pursued is an empirical, psychological one. Although I agree with him in general in his remarks about methods, I do not think he is justified in his statement that possibly the questionnaire method is more important than the experimental procedure. In psychology the results of questionnaires are of doubtful value. The situation is worse in esthetics especially when the questions are sent to artists. Experience soon teaches one that what they say about their methods and feelings has frequently little relation to the actual facts. Even the descriptions by authors of their methods of work, such as Poe's account of the composition of the *Raven*, can not be accepted uncritically.

The author accepts the traditional, philosophical definition of an esthetic object, namely, one whose value is self-contained (ihren Wert in sich selber trägt). Later, however, he broadens his concept by adding the physiological interpretation that in the perception of beauty there is an adequate reaction of the organism, which is productive of pleasure.